

## **SERVICE MODE PROCEDURES**

**Basil® 4600 Cage and Rack Washer**

**Basil® 4602 Cage and Rack Washer**

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P122996-850



# 1. Service Mode Procedures



**WARNING - PERSONAL INJURY AND/OR EQUIPMENT DAMAGE HAZARD:** Only fully qualified service personnel should make repairs and adjustments to this equipment. Maintenance done by inexperienced, unqualified personnel or installation of unauthorized parts could cause personal injury, invalidate the warranty, or result in costly damage. Contact STERIS regarding service options.

## 1.1 SERVICE MODE PROCEDURES

The Service Mode allows service personnel to:

- set general operating parameters,
- operate solenoid valves for test purposes,
- check inputs to the control for proper operation,
- etc...

Before performing any modifications in Service Mode, always obtain a printout of current cycle parameters, service mode and STERIS factory setup values, so that current values can be easily re-entered. Current cycle values may be obtained by pressing bottom portion of PRINT/PRINT VALUES rocker switch, while in Automatic mode. Service mode and Factory Setup values printout may be obtained by pressing bottom portion of PRINT/PRINT VALUES rocker switch, after entering Service Mode. Detergent setpoints and RDT readings may be obtained by pressing top portion of PRINT/PRINT VALUES rocker switch at any time.

### 1.1.1 How to Enter Service Mode

1. Lock unit electrical disconnect switch in OFF position.
2. Lower control assembly to a horizontal position, as for service.
3. Locate Double EPROM PC Board, on Control PC Board.
4. Position Dip switch 1 to ON, for Service Mode.
5. Lift control assembly to vertical position.
6. Unlock unit electrical disconnect switch, position to ON, and position printer POWER-OFF/STANDBY switch to ON. Display shows:

```
*      BASIL      *
*      MODEL 4XXX  *
```

... then:

**ENTER SERVICE MODE  
ACCESS CODE: 1091**

...and printer prints:

```
*CONTROL ON      HH:MM:SS (Time)
                  MM/DD/YY (Date)
*****
                  MODEL 4XXX
S/N 36XXXXXXXXX (Unit Serial number)
*****
```

### How to Enter Service Mode Access Code

Entering Service Mode requires the knowledge of the service access code. the service access code is composed of the last four digits of the unit serial number, inverted by pairs. For example, if the last four digits are 1234, service access code is 3412.

*NOTE: Unit Serial number (i.e. last four digits composing access code) is printed by the printer at the beginning of the Service Mode printout and written on I.D. Plate located inside Printer Control Panel.*

Enter correct service access code, as explained above, and confirm by pressing CHANGE VALUES touch pad. Display shows (typical):

**SERVICE MODE  
BASIL MODEL 4600**

... then:

```
TESTS          BURN-IN
CALIBRATE      VALUES
```

\_\_\_ indicates flashing position.

... and printer prints (typical):

```
SERVICE MODE  HH:MM:SS      (Current time)
                MM/DD/YY      (Current date)

=====
                MODEL 4600      (Current time)
=====
                                (Model number)
                                (Current time)
```

### 1.1.2 How to Perform Tests

1. Enter Service Mode, as explained in Section 1.1.1  
Display shows:

```
TESTS          BURN-IN
CALIBRATE      VALUES
```

\_\_\_ indicates flashing position.

2. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to select TESTS, then press CYCLE START touch pad to see available selections. Display shows:

**OUTPUTS**      **INPUTS**  
**PUSHBTTNS**   **TMP UNITS**

— indicates flashing position.

See Sections 1.2.2.1 to 1.2.2.4 for details about each test procedure.

#### 1.1.2.1 How to Test (Energize and De-energize) Outputs

1. Enter Service Mode, as explained in Section 1.1.1  
Display shows:

**TESTS**      **BURN-IN**  
**CALIBRATE**   **VALUES**

— indicates flashing position.

2. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to select TESTS, then press CYCLE START touch pad to see available selections. Display shows:

**OUTPUTS**      **INPUTS**  
**PUSHBTTNS**   **TMP UNITS**

— indicates flashing position.

3. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to select OUTPUTS. Press CYCLE START touch pad to confirm. Display shows:

**CTRL OUT**      **I/O 1 OUT**  
**I/O 2 OUT**      **I/O 3 OUT**

— indicates flashing position.

**NOTE:** There are no outputs on I/O Board #3.

4. Use CURSOR (left or right) touch pad to select board outputs to be tested (Control Board Outputs = CTRL OUT and I/O Board Outputs = I/O OUT) then press CYCLE START touch pad push-button to confirm.
5. Use CURSOR (left or right) touch pad to move from one output to another, and VALUE (up or down) touch pad to energize and de-energize output. Display will show the status of each output as given in **Tables 1-1, 1-2, and 1-3.**

**NOTE:** While viewing outputs, note the following:

1) It is possible to alternate between Outputs (DRIVERS) test and Inputs (LIMIT SWITCHES) test by pressing CYCLE MENU touch pad.

2) It is possible to view the reading for each Resistive Thermal Detector (RTD) while reviewing the outputs or the inputs by pressing SELECT CYCLE touch pad.

3) It is possible to view the conductivity and pH readings (if options apply), by pressing PRINT portion of printer function switch, while display is already showing RTD readings.

6. After testing desired outputs, press STOP three times to return to Service Mode main menu.

#### 1.1.2.2 How to Test Inputs

1. Enter Service Mode, as explained in Section 1.1.1  
Display shows:

**TESTS**      **BURN-IN**  
**CALIBRATE**   **VALUES**

— indicates flashing position.

2. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to select TESTS, then press CYCLE START touch pad to see available selections. Display shows:

**OUTPUTS**      **INPUTS**  
**PUSHBTTNS**   **TMP UNITS**

— indicates flashing position.

3. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to select INPUTS. Press CYCLE START touch pad to confirm. Display shows:

**CRTL IN**      **I/O 1 IN**  
**I/O 2 IN**      **I/O 3 IN**

— indicates flashing position.

**NOTE:** There are no inputs on I/O board #3.

4. Use CURSOR (left or right) touch pad to select board inputs to be tested (Control Board Inputs = CTRL IN and I/O Board Inputs = I/O IN) then press CYCLE START touch pad to confirm.
5. Display will show the status of each input as given in **Tables 1-4, 1-5 and 1-6.**

*NOTE: While viewing inputs, note the following:*

1) It is possible to alternate between Inputs (Limit switches) test and Outputs (Drivers) test by pressing **CYCLE MENU** touch pad.

2) It is possible to view the reading for each Resistive Thermal Detector (RTD) while reviewing the outputs or the inputs by pressing **SELECT CYCLE** touch pad.

3) It is possible to view the conductivity and pH readings (if options apply), by pressing **PRINT** portion of printer function switch, while display is showing RTD readings.

### 1.1.2.3 How to Test Pushbuttons

1. If not already in Service Mode, enter Service Mode as explained in Section 1.1.1. Display shows:

**TESTS**                      **BURN-IN**  
**CALIBRATE**            **VALUES**

\_\_\_ indicates flashing position.

2. Use **CURSOR** (left or right) and/or **VALUE** (up or down) touch pad to select **TESTS**, then press **CYCLE START** touch pad to see available selections. Display shows:

**OUTPUTS**                      **INPUTS**  
**PUSHBTNS**            **TMP UNITS**

\_\_\_ indicates flashing position.

3. Press **CURSOR** (left or right) and/or **VALUE** (up or down) touch pads to select **PUSHBTNS**, and **CYCLE START** touch pad to test front panel pushbuttons. Display shows:

**PUSHBUTTON TEST**

... then:

**0 1 2 3 4 5 6 7 8 9 A B C D E F G H I**

- - - - -

4. When a touch pad or a rocker switch is pressed, a «P» (for pushed) appears on the display as long as the touch pad or the rocker switch is held, to confirm that it is operating properly, for example:

**0 1 2 3 4 5 6 7 8 9 A B C D E F G H I**  
- - - - - **P** - - - - -

- **CYCLE MENU** touch pad corresponds to 0;
- **SELECT CYCLE** touch pad corresponds to 1;
- **REVIEW CYCLE** touch pad corresponds to 2;
- **CYCLE START** touch pad corresponds to 3;
- **STOP** touch pad corresponds to 4;
- **EXTEND PHASE** touch pad corresponds to 5;
- **BYPASS PHASE** touch pad corresponds to 6;
- **MANUAL MODE** touch pad corresponds to 7;
- **ALARM REPLY** touch pad corresponds to 8;
- **CHANGE VALUES** touch pad corresponds to 9;
- **CURSOR Left** touch pad corresponds to A;
- **CURSOR Right** touch pad corresponds to B;
- **VALUE Up** touch pad corresponds to C;
- **VALUE Down** touch pad corresponds to D;
- **SAVE VALUES** touch pad corresponds to E;
- **PRINT** portion of Printer Function switch corresponds to F;
- **PRINT VALUES** portion of Printer Function switch corresponds to G;
- **OFF/STANDBY** portion of Printer Power switch corresponds to H and
- **POWER** portion of Printer Power switch corresponds to I.

*NOTE: The Control Board Dip Switch Setting is checked on display after the STOP pushbutton is pressed a second time, in the Pushbutton Test.*

5. After testing all touch pads and switches, press **STOP** touch pad twice to return to Service Mode main menu.

### 1.1.3 How to Change Temperature Unit (°F and °C)

*NOTE: Always generate a printout of the currently set treatments and to ease reprogramming. Changing Temperature Units procedure ends with an automatic Manufacturer's Burn-in. All current cycle parameters will be lost and default values will be set instead.*

1. Enter Service Mode, as explained in Section 1.1.1. Display shows:

**TESTS**                      **BURN-IN**  
**CALIBRATE**            **VALUES**

\_\_\_ indicates flashing position.

2. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to select TESTS, then press CYCLE START touch pad to see available selections. Display shows:

**OUTPUTS      INPUTS**  
**PUSHBTTNS   TMP UNITS**

\_\_\_ indicates flashing position.

3. Press CURSOR (left or right) and/or VALUE (up or down) touch pad to select TMP UNITS (°F or °C) and CYCLE START touch pad to see available selections. Display shows:

**CHANGE TEMP. UNITS?**  
**NO**

\_\_\_ indicates flashing position.

4. Use VALUE (up or down) touch pad to change NO to YES, in order to change temperature units. Display shows:

**WARNING! CALIBRATION**  
**WILL BE CHANGED!**

... then:

**TEMPERATURE UNITS?**  
**CVPB=F   SVPB=C**

5. Press CHANGE VALUES touch pad to select °F  
-- or --  
press SAVE VALUES touch pad to select °C.
6. Control will automatically return to menu. Press STOP touch pad to return to Service Mode main menu.

*NOTE: If pH or Conductivity option is present on the unit, the temperature units will be the same as the Eagle 3000 control ones.*

#### 1.1.4 How to Perform Manufactuer's Burn-In

Manufacturer's Burn-In should be performed if you wish to clear the memory, and reenter cycle values.

*NOTE: Always generate a printout of the currently set treatments and values to ease reprogramming of custom-programmed cycles.*

1. Enter Service Mode, as explained in Section 1.1.1. Display shows:

**TESTS      BURN-IN**  
**CALIBRATE   VALUES**

\_\_\_ indicates flashing position.

2. Press CURSOR (left or right) and/or VALUE (up or down) pushbuttons to select BURN-IN, then press CYCLE START pushbutton to confirm. Display shows:

**SET DEFAULT VALUES?**  
**CVPB=YES   SVPB=NO**

**IMPORTANT:** If CHANGE VALUES touch pad is pressed, to confirm BURN-IN, all current cycle parameters will be lost and default values will be set instead.

3. Press CHANGE VALUES touch pad to confirm Burn-In

-- or --

press SAVE VALUES touch pad to omit burn-in.

After pressing CHANGE VALUES touch pad to confirm Burn-In, display shows:

**TESTS      BURN-IN**  
**CALIBRATE   VALUES**

\_\_\_ indicates flashing position.

... and printer prints:

**MFG BURN-IN AT HH:MM:SS**

#### 1.1.5 Calibration

##### 1.1.5.1 RTD's Calibration

1. Enter Service Mode, as explained in Section 1.1.1. Display shows:

**TESTS      BURN-IN**  
**CALIBRATE   VALUES**

\_\_\_ indicates flashing position.

2. Press CURSOR (left or right) and/or VALUE (up or down) touch pads to select CALIBRATE and press CYCLE START touch pad to confirm. Display shows:

**RTDs      ALK. CONC**  
**ACID CONC.**

\_\_\_ indicates flashing position.

*NOTE: this display is shown only if Conductivity option is present on the unit.*

3. Press SELECT CYCLE touch pad to select RTDs and press CYCLE START touch pad to confirm. Display shows:

**SUMP      ALK. TANK**  
**ACID TANK   COOLDOWN**

\_\_\_ indicates flashing position.

*NOTE: It is not possible to calibrate the RTD of an option not present on the unit.*

4. Select water temperature RTD to calibrate and remove it from its compression fitting, so it can be placed in a cup of water. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to select RTD and press CYCLE START touch pad to confirm. If sump is selected, for example, display shows:

**PUT PROBE IN LOW TMP  
BATH - PRESS CVPB**

5. Put probe in low temperature bath, then press CHANGE VALUES touch pad to confirm. Display shows for at least 10 seconds:

**STABILIZING...  
TEMP = XXX.XF**

... then:

**LOW SET PT = XXX.XF  
PRESS CVPB TO SET**  
\_\_\_ indicates flashing position.

6. Change the low set point by pressing the VALUE (up or down) touch pad, then press CHANGE VALUES touch pad to set. Printer prints:

LOW POINT SET @ XXX.XF

...and display shows:

**PUT PROBE IN HI TMP  
BATH - PRESS CVPB**

7. Put probe in hi temperature bath, then press CHANGE VALUES touch pad to confirm. Display shows for at least 10 seconds:

**STABILIZING...  
TEMP = XXX.XF**

... then:

**HI SET PT = XXX.XF  
PRESS CVPB TO SET**

(First digit of temperature blinks)

8. Change the Hi set point by pressing Value (up or down) pushbutton, then press CHANGE VALUES touch pad to set. Display shows:

**SUMP RTD  
IS CALIBRATED**

...and printer prints:

HI POINT SET @ XXX.XF  
SUMP RTD  
IS CALIBRATED

...then display goes back to main menu:

**SUMP                      ALK. TANK  
ACID TANK              COOLDOWN**

\_\_\_ indicates flashing position.

9. Once calibration is performed, press STOP touch pad to return to Service Mode main menu.

#### 1.1.5.2 Conductivity Probe(s) Calibration

1. Enter Service Mode, as explained in Sections 1.1.1. Display shows:

**TESTS                      BURN-IN  
CALIBRATE              VALUES**

\_\_\_ indicates flashing position.

2. Press CURSOR (left or right) and/or VALUE (up or down) touch pad to select CALIBRATE and press CYCLE START touch pad to confirm. Display shows:

**RTDs                      ALK. CONC  
ACID CONC**

\_\_\_ indicates flashing position.

3. Select detergent concentration to calibrate and remove conductivity probe from holder, located at pump inlet, so it can be placed in a small container. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to select ALK. CONC. or ACID CONC. and press CYCLE START touch pad to confirm. If ALK. CONC. is selected, for example, display shows:

**1/4 OZ                      1/2 OZ  
1 OZ                      2 OZ**

\_\_\_ indicates flashing position.

4. Select concentration setpoint, using CURSOR (left or right) or VALUE (up or down) touch pad, then press CYCLE START touch pad to confirm. Display shows:

**CHANGE CONCEN. NAME?  
1/4 OZ**

\_\_\_ indicates flashing position.



5. Use CURSOR (right or left) and VALUE (up or down) touch pads to modify solution concentration name, then press CHANGE VALUES touch pad to confirm new name and continue sequence of displays. New name must be 9 characters or less, chosen among A to Z, 0 to 9, underscore ( \_ ) and blank space ( ). Display shows:

**PUT PROBE IN DETERG.  
SOLUTION - PRESS CVPB**

6. Put probe detergent solution, then press CHANGE VALUES touch pad to confirm. Display shows for at least 10 seconds:

**IF STABLE - PRESS CVPB  
COND = XXX.X  $\mu$ S/cm**

       indicates flashing position.

7. Press CHANGE VALUES touch pad if reading is stable. Printer prints:

HH:MM:SS                      MM/DD/YY

ALK. DETERGENT SETPOINT  
1/4 oz = XXX.X  $\mu$ S/cm

...then display goes back to concentration setpoint menu.

8. Once desired conductivity probe calibration is performed, return probe to proper location and press STOP touch pad to return to previous menu.

### 1.1.6 How to Enable Printer

1. Enter Service Mode, as explained in Section 1.1.1. Display shows:

**TESTS                      BURN-IN  
CALIBRATE                VALUES**

       indicates flashing position.

2. Press CURSOR (left or right) and/or VALUE (up or down) touch pads to select VALUES and press CYCLE START touch pad to confirm.
3. Press CHANGE VALUES touch pad until the following is displayed:

**PRINTER ENABLED?  
YES**

       indicates flashing position.

4. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to enable/disable printer, press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to Service Mode main menu.

### 1.1.7 How to Reset Time and Date

1. Enter Service Mode, as explained in Section 1.1.1. Display shows:

**TESTS                      BURN-IN  
CALIBRATE                VALUES**

       indicates flashing position.

2. Press CURSOR (left or right) and/or VALUE (up or down) touch pads to select VALUES and press CYCLE START touch pad to confirm.
3. Press CHANGE VALUES until date and time are displayed. Display shows:

**DATE                      MM/DD/YY  
TIME                      HH:MM:SS**

       indicates flashing position.

4. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to set current time and date, press CHANGE VALUES pushbutton to confirm then SAVE VALUES pushbutton to return to Service Mode main menu.

### 1.1.8 How to Select Time Units

1. Enter Service Mode, as explained in Section 1.1.1. Display shows:

**TESTS                      BURN-IN  
CALIBRATE                VALUES**

       indicates flashing position.

2. Press CURSOR (left or right) and/or VALUE (up or down) touch pad to select VALUES and press CYCLE START touch pad to confirm.
3. Press CHANGE VALUES touch pad until time units are displayed. Display shows:

**TIME UNITS  
AM/PM**

       indicates flashing position.

4. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to select desired time units (AM/PM or 24 hr), press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to Service Mode main menu.



## 1.1.9 How to Enable/Disable Operator Access Code

### 1.1.9.1 General

The Automatic mode access code feature is provided so that once all the operating parameters have been selected and set by the supervisor, only those operators who are given the access code can enter the system to modify and/or change values of the operating parameters.

A restraint of access may be achieved by setting the number of cycles protected from access (number of cycles to lock-out). It is important to remember that locked-out cycles are always in sequential order, i.e., if only one cycle is locked-out, it will be CYCLE 1, if two are locked-out, it will be CYCLE 1 and CYCLE 2, etc.

Since only a minimum of persons should have the right to decide...

- if the access code should be enabled or not,
- if some of cycles should be locked-out or not, and,
- to verify authenticity of access code use,

...the access code is requested everytime an operator presses CHANGE VALUES touch pad (to acknowledge the right to modify cycle values).

This encourages careful consideration before enabling or disabling the access code, which has an important impact on the efficiency of the washing operations.

If access code is disabled, nothing indicates that the feature exists. SET THE ACCESS CODE ONLY IF YOU INTEND TO LOCK-OUT CYCLES; otherwise it is not necessary.

### 1.1.9.2 How to Enable Access Code

1. Enter Service Mode, as explained in Section 1.1.1. Display shows:

**TESTS**            **BURN-IN**  
**CALIBRATE**    **VALUES**

\_\_ indicates flashing position.

2. Press CURSOR (left or right) and/or VALUES (up or down) touch pads to select VALUES and press CYCLE START touch pad to confirm.

3. Press CHANGE VALUES touch pad until the following question is displayed:

**ACCESS CODE**  
**OFF**

\_\_ indicates flashing position.

4. Use VALUE (up or down) touch pad to change OFF to ON, in order to enable access code. Press CHANGE VALUES touch pad to confirm selection. Display shows:

**CHANGE ACCESS CODE?**  
**NEW CODE = 0000**

\_\_ indicates flashing position.

5. Default access code is 0000. To customize your access code number, input four new digits, using CURSOR (left or right) touch pad to go from one digit to another, and VALUE (up or down) touch pad to increase or decrease the values. Press CHANGE VALUES touch pad to confirm entry of the new code. Display shows:

**CYCLES TO LOCKOUT = 00**

\_\_ indicates flashing position.

**NOTE:** a value must be entered, otherwise control will not advance to next step.

6. Use VALUE (up or down) touch pad to enter number of cycles to lockout, between 01 and 12. Press CHANGE VALUES touch pad to confirm, then SAVE VALUES touch pad to save your setting and come back to main menu.

### 1.1.10 How to Reset Cycle and Service Counts

Cycle and Service counts are used to plan preventive maintenance of the unit. After the number of cycles and/or days (whichever comes first) set, a message will warn customer that it is time to call the technician. The following reset procedure must be performed everytime the following alarm message is displayed:

**MAINTENANCE DUE!**  
**CALL SERVICE**

1. If buzzing signal and alarm message are present, first press ALARM REPLY touch pad.

2. Enter Service Mode, as explained in Section 1.1.1.  
Display shows:

**TESTS**                      **BURN-IN**  
**CALIBRATE**           **VALUES**

\_\_\_ indicates flashing position.

3. Press CURSOR (left or right) and/or VALUE (up or down) touch pads to select VALUES and press CYCLE START touch pad to confirm.
4. Press CHANGE VALUES touch pad until the following is displayed:

**CYCLE CNT = 00000001**  
**RESERVICE AFTER 9999**

\_\_\_ indicates flashing position.

5. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to reset Cycle Count value and Reservice After value (1 - 9999), then press CHANGE VALUES touch pad to confirm. Display shows:

**RESERVICE IN**  
**9998 DAYS**

\_\_\_ indicates flashing position.

6. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to reset desired value (1 - 9999), press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to Service Mode main menu.

**IMPORTANT:** Reset only the RESERVICE AFTER... and RESERVICE IN... values EVERYTIME buzzing signal is heard and alarm message is displayed. If customer is not on preventive maintenance plan, set RESERVICE AFTER... and RESERVICE IN ... to maximum value (9999). The alarm message will occur every 10 000 cycles only.

#### 1.1.11 How to Modify filling times, heating times, draining times, detergent Injection Times, and Water/Solution Temperatures

1. Enter Service Mode, as explained in Section 1.1.1.  
Display shows:

**TESTS**                      **BURN-IN**  
**CALIBRATE**           **VALUES**

\_\_\_ indicates flashing position.

2. Press CURSOR (left or right) and/or VALUE (up or down) touch pads to select VALUES and press CYCLE START touch pad to confirm. Display shows:

**SUMP FILL = 05 min**  
**HEADER DELAY = 02 sec**

\_\_\_ indicates flashing position.

3. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to modify sump fill time (01 - 99 min) and time delay (01 - 99 sec) before travelling header will change direction. Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES pushbutton to confirm and continue sequence of displays. Display shows:

**SUMP DRAIN = 01:00**  
**HEADER DRAIN = 10 sec**

\_\_\_ indicates flashing position.

4. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify sump (00:01 - 99.99 min) and header drain times (01 - 99 sec). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**SUMP FILL EXTENSION**  
**TIME = 03 sec**

\_\_\_ indicates flashing position.

5. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to modify sump fill extension time (additional water filling to avoid pump cavitation) (03 - 15 sec). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**SUMP FLUSH = 00:30**  
**FLUSH DRAIN = 00:45**

\_\_\_ indicates flashing position.

6. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify sump flush (00:01 - 99.99 min) and flush drain (00:01 - 00:99 min) times. Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**GRAVITY DRAIN = 00:30**

\_\_\_ indicates flashing position.

7. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to modify gravity drain time (00:01 - 99.99 min). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**RE-USED WATER  
TRANSFER TIME = 01:00**

\_\_\_ indicates flashing position.

8. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to modify time during which reused water is transferred from tank to sump (00:01 - 99.99 min). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**TANK FILL = 05 min  
TANK DRAIN = 02 min**

\_\_\_ indicates flashing position.

9. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to modify tank fill (01 - 99 min) and drain (01 - 99 min) times. Press CHANGE VALUES touch pad to confirm then SAVE VALUES pushbutton to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**SUMP HEAT = 10 min  
TANK HEAT = 10 min**

\_\_\_ indicates flashing position.

10. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to modify sump (01 - 45 min) and tank heat (01 - 99 min) times. Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**ALKALINE TANK  
TEMPERATURE = 140.0F**

\_\_\_ indicates flashing position.

11. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to modify alkaline tank temperature (70-185°F [22-85°C]). Press CHANGE VALUES touch pad to confirm then SAVE VALUES pushbutton to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**ACID TANK  
TEMPERATURE = 140.0F**

\_\_\_ indicates flashing position.

12. Use CURSOR (left or right) and/or VALUE (up or down) touch pad to modify acid tank temperature (70-185°F [22-85°C]). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**COOLDOWN TIME = 03.00  
COOLDOWN TEMP = 140.0F**

\_\_\_ indicates flashing position.

13. Use CURSOR (left or right) and/or VALUE (up or down) pushbutton to modify cooldown time (00:01 - 99.99 min) and temperature (0-185°F [17.7-85°C]). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**COOLDOWN TANK  
DRAIN TIME = 03 min**

\_\_\_ indicates flashing position.

14. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify cooldown tank drain time (01 - 99 min). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**COMPLETE CYCLE**  
**ALARM TIME = 01 min**

\_\_\_ indicates flashing position.

15. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify time length (01 - 99 min) after which alarm tone will stop. Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**DETERGENT MONITORING**  
**TIME = 03:00**

\_\_\_ indicates flashing position.

16. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify maximum time (00:01 - 99:99 min) allowed to reach detergent setpoint when conductivity option is ON. Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**ALK. INJ. T = MM:SS**  
**ACID INJ. T = MM:SS**

\_\_\_ indicates flashing position.

**NOTE:** This question is displayed only if unit is provided with side tank(s).

17. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify time (00:01 - 99:99 min.) during which detergent is injected, if unit is equipped with a basic peristaltic pump to inject detergent. Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**pH NEUTRALIZATION**  
**LIMITS LO = 06 HI = 09**

\_\_\_ indicates flashing position.

18. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify hi and lo pH limits (between 01 and 14). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**pH NEUTRALIZATION**  
**MIX TIME = 45 sec**

\_\_\_ indicates flashing position.

19. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify time (01 - 99 sec) during which water and detergent are mixed, once pH level is within limits. Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**pH NEUTRALIZATION**  
**NUMBER OF TRIES = 09**

\_\_\_ indicates flashing position.

20. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify pH neutralization number of tries (between 3 and 15). Press CHANGE VALUES touch pad to confirm then SAVE VALUES pushbutton to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**ALKALINE NEUTRALIZER**  
**INJECT = 05 WAIT = 45**

\_\_\_ indicates flashing position.

21. Use CURSOR (left or right) and/or VALUES (up or down) touch pads to modify alkaline neutralizer injection time (02 - 99 sec) and time delay between two injections (02 - 99 sec). Press CHANGE VALUES pushbutton to confirm then SAVE VALUES pushbutton to return to main menu, or CHANGE VALUES pushbutton to confirm and continue sequence of displays. Display shows:

**ACID NEUTRALIZER**  
**INJECT = 10 WAIT = 45**

\_\_\_ indicates flashing position.

22. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify acid neutralizer injection time (01 - 99 sec) and time delay between two injections (01 - 99 sec). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**HIGH pH CONTAINMENT  
INJECTION TIME = 02**

\_\_ indicates flashing position.

23. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify injection time required to contain hi pH value (01 - 98 sec). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**LOW pH CONTAINMENT  
INJECTION TIME = 06**

\_\_ indicates flashing position.

24. Use CURSOR (left or right) and/or VALUE (up or down) touch pads to modify injection time required to contain low pH value (01 - 98 sec). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu, or CHANGE VALUES touch pad to confirm and continue sequence of displays. Display shows:

**NUMBER OF CHEMICAL  
PUMPS = X**

\_\_ indicates flashing position.

*NOTE: This question is asked only if pH option is present and neutralization is performed in the sump.*

25. Use VALUE (up or down) touch pad to set number of chemical injection pumps (between 2 and 4). Press CHANGE VALUES touch pad to confirm then SAVE VALUES touch pad to return to main menu.

#### 1.1.12 How to Exit Service Mode

To exit Service Mode (once back in main service menu), return Double Eprom Service Mode dipswitch #1 to OFF, and press POWER-OFF/STANDBY touch pad down to OFF/STANDBY, then up to POWER.

## 1.2. FACTORY SETUP MODE

*NOTE: Always obtain a printout of currently set options and values, using PRINT VALUES rocker switch, in automatic and service modes, before entering factory setup, to ease reprogramming.*

The STERIS Factory Setup mode has three different purposes. It is used either for resetting all options when a new EPROM and/or RAM is installed into unit, to set a new option just added to the unit, or temporarily freeze the use of an option (if a component of this option is defective, for example, but you can still run cycles without using that option). Some options are presently standard features however, document has not been changed accordingly as to keep backward compatibility.

1. Enter Service Mode as explained in Section 1.1.1. Display shows:

**ENTER SERVICE MODE  
ACCESS CODE: 1091**

\_\_ indicates flashing position.

2. Enter Factory Setup Access code:

- Press ALARM REPLY touch pad;
- Press MANUAL MODE touch pad;
- Press ALARM REPLY touch pad;
- Press MANUAL MODE touch pad.

3. Press CHANGE VALUES touch pad. Display shows:

**DELETE CONFIGURATION  
CVPB=YES SVPB=NO**

4. If installing a new EPROM and/or RAM, press CHANGE VALUES touch pad to erase configuration and reset hardware options. If adding a new option to the unit, press SAVE VALUES touch pad to say OFF and simply answer questions without erasing current option hardware settings. Display shows:

**UNIT MODEL IS 4600**

\_\_ indicates flashing position.

5. Enter correct Model number, using CURSOR (left or right) and VALUE (up or down) touch pads, then press CHANGE VALUES touch pad to confirm. Display shows:

**UNIT SERIAL NUMBER  
36XXXXXXXX**

\_\_ indicates flashing position.



6. Set Serial Number, using CURSOR (left or right) and VALUE (up or down) touch pads. Press CHANGE VALUES touch pad to confirm entry of serial number. Display shows:

**ACID WASH OPTION**  
**OFF**

— indicates flashing position.

7. If unit is not provided with acid wash option, press CHANGE VALUES touch pad to confirm OFF selection. If unit is provided with acid wash option, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**ACID TANK OPTION**  
**OFF**

— indicates flashing position.

**NOTE:** This question is asked only if unit is provided with acid wash option.

8. If unit without acid solution tank option, press CHANGE VALUES touch pad to confirm. If unit with acid solution tank option, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm. Display shows:

**CONDUCTIVITY OPTION**  
**OFF**

— indicates flashing position.

9. If unit without Conductivity option, press CHANGE VALUES touch pad to confirm. If unit with Conductivity option, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**pH NEUTRALIZATION**  
**ON**

— indicates flashing position.

10. If unit with pH Neutralization option, press CHANGE VALUES touch pad to confirm. If unit without pH Neutralization option, press VALUE (up) touch pad to change ON to OFF, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**TIME BASED NEUTRAL**  
**ON**

— indicates flashing position.

**NOTE:** This question is displayed only if pH Neutralization is ON.

11. If neutralization is performed without a pH controller, press CHANGE VALUES touch pad to confirm ON. If neutralization is time based, press VALUE (up) touch pad to change ON to OFF, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**DRAIN COOLDOWN**  
**OFF**

— indicates flashing position.

12. If unit without drain cooldown system, press CHANGE VALUES touch pad to confirm OFF. If unit with Drain Cooldown system, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**GUARANTEED COOLDOWN**  
**OFF**

— indicates flashing position.

**NOTE:** Regarding GUARANTEED COOLDOWN feature, note the following:

1) This question is displayed only if Drain Cooldown is ON.

2) If this feature is set to ON, value must be entered in Service Mode.

13. If guaranteed cooldown is not desired, press CHANGE VALUES touch pad to confirm OFF. If guaranteed cooldown is desired (tank solution temperature cooled down under 140°F by default), press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**COOLDOWN TANK**  
**ON**

— indicates flashing position.

**NOTE:** This question is displayed only if 1) Drain Cooldown is ON 2) Guaranteed Cooldown is OFF.

14. If unit with cooldown tank, press CHANGE VALUES touch pad to confirm ON. If unit with cooldown tank, press VALUE (up) touch pad to change ON to OFF, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**BOTTLE WASH OPTION**  
**ON**

— indicates flashing position.

15. If unit with Bottle wash option, press CHANGE VALUES touch pad to confirm ON. If unit without bottle wash option, press VALUE (up) touch pad to change ON to OFF, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**DOOR INTERLOCK  
OFF**

— indicates flashing position.

16. If unit without Door Interlock, press CHANGE VALUES touch pad to confirm OFF. If unit with Door Interlock, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**FULLY DRAINABLE SUMP  
ON**

— indicates flashing position.

17. If unit without fully drainable sump feature, press CHANGE VALUES touch pad to confirm ON. If unit with fully drainable sump feature, press VALUE (up) touch pad to change ON to OFF, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**RS-232 OPTION  
OFF**

— indicates flashing position.

18. If unit without RS-232 interface link to print or transfer in-cycle parameters to a computer terminal, press CHANGE VALUES touch pad to confirm OFF. If unit with RS-232 interface link to print or transfer in-cycle parameters to a computer terminal, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**HEAT EXCHANGER  
OFF**

— indicates flashing position.

19. If unit without heat exchanger, press CHANGE VALUES touch pad to confirm OFF. If unit with heat exchanger, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**NON-RECIRC. F. RINSE  
OFF**

— indicates flashing position.

20. If unit without non-recirculated final rinse, press CHANGE VALUES touch pad to confirm OFF. If unit with non-recirculated final rinse, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**GUAR. TEMP. SIGNAL  
OFF**

— indicates flashing position.

21. If unit without guaranteed temperature output signal, press CHANGE VALUES touch pad to confirm OFF. If unit with guaranteed temperature output signal, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**WATER RACK FLUSH  
OFF**

— indicates flashing position.

22. If unit without water rack flush option, press CHANGE VALUES touch pad to confirm OFF. If unit with water rack flush option, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**SUMP FLUSH OPTION  
OFF**

— indicates flashing position.

**NOTE:** This question is displayed only if Fully Drainable Sump is OFF.

23. If unit without sump flush option, press CHANGE VALUES touch pad to confirm OFF. If unit with sump flush option, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**DETERGENT LEVEL(S)  
OFF**

— indicates flashing position.

24. If unit without detergent level monitoring, press CHANGE VALUES touch pad to confirm OFF. If unit with detergent level monitoring, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**EXTERNAL ALARM  
OFF**

— indicates flashing position.



25. If unit without external alarm signal, press CHANGE VALUES touch pad to confirm OFF. If unit with external alarm signal, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**TIMED COMPLETE ALARM**  
**OFF**

— indicates flashing position.

*NOTE: If this feature is set to ON, value must be entered in Service Mode.*

26. If you do not wish to set a specific time for the length of the Complete Cycle alarm, press CHANGE VALUES touch pad to confirm OFF. If you wish to set a specific time for the length of the Complete Cycle alarm, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES pushbutton to confirm selection. Display shows:

**PIT LEVEL OPTION**  
**OFF**

— indicates flashing position.

27. If unit without pit level option, press CHANGE VALUES touch pad to confirm OFF. If unit with pit level option, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**CENTRAL HEADER**  
**OFF**

— indicates flashing position.

28. If unit without central header option, press CHANGE VALUES touch pad to confirm OFF. If unit with central header option, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**NON-REVERSING HEADER**  
**OFF**

— indicates flashing position.

29. If unit without non-reversing header option, press CHANGE VALUES touch pad to confirm OFF. If unit with non-reversing header option, press VALUE (up) touch pad to change OFF to ON, then press CHANGE VALUES touch pad to confirm selection. Display shows:

**REVIEW OPTIONS AGAIN**  
**CVPB=YES    SVPB=NO**

30. Press CHANGE VALUES touch pad if you wish to review the new setting, or SAVE VALUES touch pad to return to Service Mode main menu. When SAVE VALUES touch pad is pressed, display shows:

**TESTS**                      **BURN-IN**  
**CALIBRATE**                **VALUES**

— indicates flashing position.

31. Lock electrical disconnect switch to OFF, then return Dip switch 1 to OFF.
32. Press POWER-OFF/STANDBY touch pad down then up, to return to Automatic Mode. Display shows:

**CYCLE 1**                      **CYCLE 2**  
**CYCLE 3**                      **CYCLE 4**

— indicates flashing position.

33. Set cycles and cycle values, using printout obtained at the beginning.

**TABLE 1-1. OUTPUTS - CONTROL BOARD**

dp dp	AC5	— —	Alkaline detergent pump and/or relay not energized <sup>1-2</sup> Alkaline detergent pump and/or relay energized
ap AP	AC6	— —	Acid detergent pump and/or relay not energized <sup>1-2</sup> Acid detergent pump and/or relay energized
kn KN —	AC7	— — —	Alkaline solution neutralizer pump and/or relay not energized <sup>1-2</sup> Alkaline solution neutralizer pump and/or relay energized Alkaline neutralizer option not available
ss SS	AC8	— —	Sump steam valve not energized Sump steam valve energized
cd CD	AC9	— —	Cool down tank fill valve or Drain cooling valve not energized Cool down tank fill valve or Drain cooling valve energized
cn CN	AC10	— —	Acid solution neutralizer pump and/or relay not energized <sup>1-2</sup> Acid solution neutralizer pump and/or relay energized
rl RL	AC4	— —	RS-232 Relay not energized RS-232 Relay energized
nv NV —	AC11	— — —	Non-recirculated Final Rinse fill valve not energized <sup>1-2</sup> Non-recirculated Final Rinse fill valve energized Non-recirculated Final Rinse option not available
fr FR —	AC12	— — —	Guarantee temperature dry contact relay not energized Guarantee temperature dry contact relay energized Guarantee temperature dry contact relay option not available
wf WF —	AC3	— — —	Automatic water rack flush fill valve not energized <sup>1-2</sup> Automatic water rack flush fill valve energized Automatic water rack flush option not available
sf SF —	AC2	— — —	Sump flush fill valve not energized Sump flush fill valve energized Sump flush option not available
lt LT —	AC1	— — —	Alarm - Strobe light relay not energized Alarm - Strobe light relay energized External alarm relay option not available
be BE —	AC0	— — —	Alarm - Bell not energized Alarm - Bell energized External alarm option not available
hr HR —	DC1A	— — —	Alarm - Horn not energized Alarm - Horn energized External alarm option not available

1- Door(s) must be closed to energize the output

2- As soon as a door opens, the output is de-energized

**TABLE 1-2. OUTPUTS – I/O BOARD #1**

<b>B2</b>			<b>I/O board #1</b>
<b>hw</b> <b>HW</b>	<b>AC0</b>	— —	<b>Sump hot water fill valve not energized <sup>1-2</sup></b> <b>Sump hot water fill valve energized</b>
<b>af</b> <b>AF</b>	<b>AC1</b>	— —	<b>Alkaline tank fill valve not energized</b> <b>Alkaline tank fill valve energized</b>
<b>ds</b> <b>DS</b>	<b>AC2</b>	— —	<b>Alkaline tank steam valve not energized</b> <b>Alkaline tank steam valve energized</b>
<b>cf</b> <b>CF</b>	<b>AC3</b>	— —	<b>Traveller not moving forward or not energized</b> <b>Traveller moving forward (unload end side) or energized</b>
<b>cr</b> <b>CR</b> —	<b>AC4</b>	— — —	<b>Traveller not moving backward</b> <b>Traveller moving backward (load end side)</b> <b>Non-Reversing Header option</b>
<b>t1</b> <b>T1</b>	<b>AC5</b>	— —	<b>Recirculation pump #1 not energized <sup>1-2</sup></b> <b>Recirculation pump #1 energized</b>
<b>fn</b> <b>FN</b>	<b>AC6</b>	— —	<b>Exhaust fan or relay not energized</b> <b>Exhaust fan or relay energized</b>
<b>ad</b> <b>AD</b>	<b>AC7</b>	— —	<b>Automatic damper not energized</b> <b>Automatic damper energized</b>
<b>j1</b> <b>J1</b> — <b>XX</b>	<b>AC8</b>	— — — —	<b>Jet system ball valve #1 closed</b> <b>Jet system ball valve #1 open</b> <b>Jet system ball valve #1 not open and not closed</b> <b>Jet system ball valve #1 open and closed (malfunction)</b>
<b>ct</b> <b>CT</b> — <b>XX</b>	<b>AC9</b>	— — — —	<b>Bottle wash ball valve closed</b> <b>Bottle wash ball valve open</b> <b>Bottle wash ball valve not open and not closed</b> <b>Bottle wash ball valve open and closed (malfunction)</b>
<b>sd</b> <b>SD</b> — <b>XX</b>	<b>AC10</b>	— — — —	<b>Sump drain ball valve #1 closed</b> <b>Sump drain ball valve #1 open</b> <b>Sump drain ball valve #1 not open and not closed</b> <b>Sump drain ball valve #1 open and closed (malfunction)</b>
<b>dr</b> <b>DR</b> — <b>XX</b>	<b>AC11</b>	— — — —	<b>Alkaline tank return ball valve closed</b> <b>Alkaline tank return ball valve open</b> <b>Alkaline tank return ball valve not open and not closed</b> <b>Alkaline tank return ball valve open and closed (malfunction)</b>
<b>dd</b> <b>DD</b> — <b>XX</b>	<b>AC12</b>	— — — —	<b>Alkaline tank dump ball valve closed <sup>1-2</sup></b> <b>Alkaline tank dump ball valve open</b> <b>Alkaline tank dump ball valve not open and not closed</b> <b>Alkaline tank dump ball valve open and closed (malfunction)</b>

1- Door(s) must be closed to energize the output

2- As soon as a door opens, the output is de-energized

**TABLE 1-3. OUTPUTS – I/O BOARD #2**

<b>B3</b>			<b>I/O board #2</b>
<b>af</b> <b>AF</b> —	<b>AC0</b>	— — —	<b>Acid tank fill valve not energized</b> <b>Acid tank fill valve energized</b> <b>Acid tank option is not available</b>
<b>as</b> <b>AS</b> —	<b>AC1</b>	— — —	<b>Acid tank steam valve not energized</b> <b>Acid tank steam valve energized</b> <b>Acid tank option is not available</b>
<b>li</b> <b>LI</b> —	<b>AC2</b>	— — —	<b>Load door interlock solenoid not energized</b> <b>Load door interlock solenoid energized</b> <b>Door interlock option is not available</b>
<b>t2</b> <b>T2</b> —	<b>AC3</b>	— — —	<b>Recirculation pump #2 not energized</b> <sup>1-2</sup> <b>Recirculation pump #2 energized</b> <b>There is only 1 recirculation pump</b>
<b>ui</b> <b>UI</b> —	<b>AC4</b>	— — —	<b>Unload door interlock solenoid not energized</b> <b>Unload door interlock solenoid energized</b> <b>Door interlock option is not available</b>
<b>hx</b> <b>HX</b> —	<b>AC5</b>	— — —	<b>Heat exchanger steam valve not energized</b> <b>Heat exchanger steam valve energized</b> <b>Heat exchanger option is not available</b>
<b>mx</b> <b>MX</b> —	<b>AC6</b>	— — —	<b>Cool down tank mixing motor not energized</b> <b>Cool down tank mixing motor energized</b> <b>Cool down tank option is not available</b>
<b>gv</b> <b>GV</b> — <b>XX</b> —	<b>AC7</b>	— — — — —	<b>Sump gravity drain ball valve not energized</b> <sup>3</sup> <b>Sump gravity drain ball valve energized</b> <b>Sump gravity drain ball valve not open and not closed</b> <b>Sump gravity drain ball valve open and closed (malfunction)</b> <b>Sump gravity drain option is not available</b>
<b>fv</b> <b>FV</b> — <b>XX</b> —	<b>AC7</b>	— — — — —	<b>Sump flush ball valve not energized</b> <sup>3</sup> <b>Sump flush ball valve energized</b> <b>Sump flush ball valve not open and not closed</b> <b>Sump flush ball valve open and closed (malfunction)</b> <b>Sump flush option is not available</b>
<b>j2</b> <b>J2</b> — <b>XX</b> —	<b>AC8</b>	— — — — —	<b>Jet system ball valve #2 closed</b> <b>Jet system ball valve #2 open</b> <b>Jet system ball valve #2 not open and not closed</b> <b>Jet system ball valve #2 open and closed (malfunction)</b> <b>Only 1 jet ball valve</b>
<b>s2</b> <b>S2</b> — <b>XX</b> —	<b>AC9</b>	— — — — —	<b>Sump drain ball valve #2 closed</b> <b>Sump drain ball valve #2 open</b> <b>Sump drain ball valve #2 not open and not closed</b> <b>Sump drain ball valve #2 open and closed (malfunction)</b> <b>Only 1 sump drain ball valve</b>

1- Door(s) must be closed to energize the output

2- As soon as a door opens, the output is de-energized

3- The sump flush and the gravity drain ball valves share the same input/output.

**TABLE 1-3. OUTPUTS – I/O BOARD #2 (Cont'd)**

<b>B3</b>			<b>I/O board #2</b>
<b>ad</b> <b>AD</b> — <b>XX</b> —	<b>AC10</b>	— — — — —	<b>Acid tank dump ball valve closed <sup>1-2</sup></b> <b>Acid tank dump ball valve open</b> <b>Acid tank dump ball valve not open and not closed</b> <b>Acid tank dump ball valve open and closed (malfunction)</b> <b>Acid tank option is not available</b>
<b>ar</b> <b>AR</b> — <b>XX</b> —	<b>AC11</b>	— — — — —	<b>Acid tank return ball valve closed</b> <b>Acid tank return ball valve open</b> <b>Acid tank return ball valve not open and not closed</b> <b>Acid tank return ball valve open and closed (malfunction)</b> <b>Acid tank option is not available</b>
<b>cd</b> <b>CD</b> — <b>XX</b> —	<b>AC12</b>	— — — — —	<b>Guarantee Cooling tank drain ball valve closed</b> <b>Guarantee Cooling tank drain ball valve open</b> <b>Guarantee Cooling tank drain ball valve not open and not closed</b> <b>Guarantee Cooling tank drain ball valve open/closed (malfunction)</b> <b>Guarantee Cool down tank option is not available</b>

1- Door(s) must be closed to energize the output

2- As soon as a door opens, the output is de-energized

**TABLE 1-4. INPUTS – CONTROL BOARD**

<b>ec</b> <b>EC</b>	<b>LS0</b>	— —	<b>Emergency cable activated</b> <b>Emergency cable not activated</b>
<b>ld</b> <b>LD</b>	<b>LS1</b>	— —	<b>Load door open</b> <b>Load door closed</b>
<b>ud</b> <b>UD</b>	<b>LS2</b>	— —	<b>Unload door open</b> <b>Unload door closed</b>
<b>df</b> <b>DF</b> —	<b>LS3</b>	— — —	<b>Traveller not fully forward</b> <b>Traveller fully forward (load end side)</b> <b>Non-Reversing Header option</b>
<b>dr</b> <b>DR</b> —	<b>LS4</b>	— — —	<b>Traveller not fully reversed</b> <b>Traveller fully reversed (unload end side)</b> <b>Non-Reversing Header option</b>
<b>sl</b> <b>SL</b>	<b>LS5</b>	— —	<b>Sump water level reached</b> <b>Sump water level not reached</b>
<b>ch</b> <b>CH</b> —	<b>LS6</b>	— — —	<b>Cool down tank high water level reached</b> <b>Cool down tank high water level not reached</b> <b>Guarantee Cool down tank option not available</b>
<b>cl</b> <b>CL</b> —	<b>LS7</b>	— — —	<b>Cool down tank low water level reached</b> <b>Cool down tank low water level not reached</b> <b>Guarantee Cool down tank option not available</b>
<b>pb</b> <b>PB</b>	<b>LS8</b>	— —	<b>Emergency stop pushbutton pressed</b> <b>Emergency stop pushbutton not pressed</b>
<b>go</b> <b>GO</b> —	<b>LS9</b>	— — —	<b>Sump gravity drain ball valve open <sup>1</sup></b> <b>Sump gravity drain ball valve not open</b> <b>Sump gravity drain option not available</b>
<b>gc</b> <b>GC</b> —	<b>LS10</b>	— — —	<b>Sump gravity drain ball valve closed <sup>1</sup></b> <b>Sump gravity drain ball valve not closed</b> <b>Sump gravity drain option not available</b>
<b>fo</b> <b>FO</b> —	<b>LS9</b>	— — —	<b>Sump flush ball valve open <sup>1</sup></b> <b>Sump flush ball valve not open</b> <b>Sump flush option not available</b>
<b>fc</b> <b>FC</b> —	<b>LS10</b>	— — —	<b>Sump flush ball valve closed <sup>1</sup></b> <b>Sump flush ball valve not closed</b> <b>Sump flush option not available</b>
<b>dl</b> <b>DL</b> —	<b>LS11</b>	— — —	<b>Detergent container(s) empty</b> <b>Detergent container(s) not empty</b> <b>Detergent level monitoring option not available</b>
<b>pt</b> <b>PT</b> —	<b>LS13</b>	— — —	<b>Pit water level reached</b> <b>Pit water level not reached</b> <b>External alarm option not available</b>

1- The sump flush and the gravity drain ball valves share the same input/output.

**TABLE 1-5. INPUTS – I/O BOARD #1**

<b>B2</b>			<b>I/O board #1</b>
<b>jo</b> <b>JO</b>	<b>LS0</b>	— —	<b>Jet system ball valve #1 open</b> <b>Jet system ball valve #1 not open</b>
<b>jc</b> <b>JC</b>	<b>LS1</b>	— —	<b>Jet system ball valve #1 closed</b> <b>Jet system ball valve #1 not closed</b>
<b>co</b> <b>CO</b>	<b>LS2</b>	— —	<b>Bottle wash ball valve open</b> <b>Bottle wash ball valve not open</b>
<b>cc</b> <b>CC</b>	<b>LS3</b>	— —	<b>Bottle wash ball valve closed</b> <b>Bottle wash ball valve not closed</b>
<b>do</b> <b>DO</b>	<b>LS4</b>	— —	<b>Sump drain ball valve #1 open</b> <b>Sump drain ball valve #1 not open</b>
<b>dc</b> <b>DC</b>	<b>LS5</b>	— —	<b>Sump drain ball valve #1 closed</b> <b>Sump drain ball valve #1 not closed</b>
<b>ro</b> <b>RO</b>	<b>LS6</b>	— —	<b>Alkaline tank return ball valve open</b> <b>Alkaline tank return ball valve not open</b>
<b>rc</b> <b>RC</b>	<b>LS7</b>	— —	<b>Alkaline tank return ball valve closed</b> <b>Alkaline tank return ball valve not closed</b>
<b>ao</b> <b>AO</b>	<b>LS8</b>	— —	<b>Alkaline tank dump ball valve open</b> <b>Alkaline tank dump ball valve not open</b>
<b>ac</b> <b>AC</b>	<b>LS9</b>	— —	<b>Alkaline tank dump ball valve closed</b> <b>Alkaline tank dump ball valve not closed</b>
<b>tl</b> <b>TL</b>	<b>LS10</b>	— —	<b>Alkaline tank high water level reached</b> <b>Alkaline tank high water not level reached</b>
<b>r1</b> <b>R1</b> —	<b>LS11</b>	— —	<b>Conductivity relay (Relay 1) on Thornton controller open</b> <b>Conductivity relay (Relay 1) on Thornton controller closed</b> <b>Conductivity option with Thornton controller is not available</b>



**TABLE 1-6. INPUTS – I/O BOARD #2**

<b>B3</b>			<b>I/O board #2</b>
<b>ao</b> <b>AO</b> —	<b>LS0</b>	— — —	<b>Acid tank dump ball valve open</b> <b>Acid tank dump ball valve not open</b> <b>Acid tank option is not available</b>
<b>ac</b> <b>AC</b> —	<b>LS1</b>	— — —	<b>Acid tank dump ball valve closed</b> <b>Acid tank dump ball valve not closed</b> <b>Acid tank option is not available</b>
<b>ro</b> <b>RO</b> —	<b>LS2</b>	— — —	<b>Acid tank return ball valve open</b> <b>Acid tank return ball valve not open</b> <b>Acid tank option is not available</b>
<b>rc</b> <b>RC</b> —	<b>LS3</b>	— — —	<b>Acid tank return ball valve closed</b> <b>Acid tank return ball valve not closed</b> <b>Acid tank option is not available</b>
<b>jo</b> <b>JO</b> —	<b>LS4</b>	— — —	<b>Jet system ball valve #2 open</b> <b>Jet system ball valve #2 not open</b> <b>Only 1 jet ball valve</b>
<b>jc</b> <b>JC</b> —	<b>LS5</b>	— — —	<b>Jet system ball valve #2 closed</b> <b>Jet system ball valve #2 not closed</b> <b>Only 1 jet ball valve</b>
<b>so</b> <b>SO</b> —	<b>LS6</b>	— — —	<b>Sump drain ball valve #2 open</b> <b>Sump drain ball valve #2 not open</b> <b>Only 1 sump drain ball valve</b>
<b>sc</b> <b>SC</b> —	<b>LS7</b>	— — —	<b>Sump drain ball valve #2 closed</b> <b>Sump drain ball valve #2 not closed</b> <b>Only 1 sump drain ball valve</b>
<b>co</b> <b>CO</b> —	<b>LS8</b>	— — —	<b>Cool down tank drain ball valve open</b> <b>Cool down tank drain ball valve not open</b> <b>Guarantee Cool down tank option is not available</b>
<b>cc</b> <b>CC</b> —	<b>LS9</b>	— — —	<b>Cool down tank drain ball valve closed</b> <b>Cool down tank drain ball valve not closed</b> <b>Guarantee Cool down tank option is not available</b>
<b>tl</b> <b>TL</b> —	<b>LS10</b>	— — —	<b>Acid tank high water level reached</b> <b>Acid tank high water not level reached</b> <b>Acid tank option is not available</b>
<b>r2</b> <b>R2</b> —	<b>LS11</b>	— — —	<b>pH relay (Relay 2) on Thornton controller open</b> <b>pH relay (Relay 2) on Thornton controller closed</b> <b>pH neutralization with Thornton controller is not available</b>

**Table 1-7. DIP SWITCH SETTINGS**

Printer Interface PC Board	
Dip Switch	Function
1-2-3	Address #1
4	Not Used
5	Printer Type
6	Display Self Test
N.B. Default Dip Switch Settings	1-2 = ON 3-4-5-6 = OFF

**Table 1-8. DIP SWITCH SETTINGS**

Printer PC Board	
Dip Switch	Function
1	Self Test
2	Serial = ON Parallel =OFF
3	Not Used
4	Not Used
5-6	Baud Rate = 9600 kb
N.B. Default Dip Switch Settings 2 =ON                      1-3-4-5-6 =OFF	

**Table 1-9. DIP SWITCH SETTINGS**

Remote Panel Interface PC Board	
Dip Switch	Function
1-2-3	Address #1
4	Not Used
5	Printer Type
6	Display Self Test
N.B. Default Dip Switch Settings 1-2 =ON                      3-4-5-6=OFF	

**Table 1-10. DIP SWITCH SETTINGS**

Control PC Board	
Dip Switch	Function
1	Spare
2	Spare
3	Spare
4	Spare
5	Max. Number of Boards Low Bit
6	Max. Number of Boards Hi Bit
N.B. Default Dip Switch Settings 1-2-3-4 =OFF  Setting for Boards Configuration:  5-6 =OFF =1 Control Board, 1 I/O Boards  5 ON, 6 OFF = 1 Control Board, 2 I/O Boards  5 OFF, 6 ON = 1 Control Board, 3 I/O Boards	

**Table 1-11. DIP SWITCH SETTINGS**

I/O Driver Board #1	
Dip Switch	Function
1-3	Address #1
4	Spare
5	Spare
6	Not Used
N.B. Default Dip Switch Settings 2 =ON                      1-3-4-5-6=OFF	

**Table 1-12. DIP SWITCH SETTINGS**

<b>I/O Driver Board #2</b>	
<b>Dip Switch</b>	<b>Function</b>
<b>1-3</b>	<b>Address #2</b>
<b>4</b>	<b>Spare</b>
<b>5</b>	<b>Spare</b>
<b>6</b>	<b>Not Used</b>
<b>N.B. Default Dip Switch Settings</b> <b>1-2 =ON                      3-4-5-6 = OFF</b>	

**Table 1-13. DIP SWITCH SETTINGS**

<b>Interface Unit PC Board</b>	
<b>Dip Switch</b>	<b>Function</b>
<b>1-3</b>	<b>Baud Rate = 1200 kb</b>
<b>4</b>	<b>Parity = None</b>
<b>5</b>	<b>Modem Function = disabled</b>
<b>6</b>	<b>Interface Unit Address = 128</b>
<b>7-8</b>	<b>Network Data Rate = 691.2 Kb</b>
<b>N.B. Default Dip Switch Settings</b> <b>1-2-3-4-7 = DOWN    5-6 =UP</b>	

## TYPICAL PRINT VALUES IN SERVICE MODE

```

4:01:05p    10/10/96

=====
WASHER OPTIONS
=====

ALK. TANK OPTION
ACID WASH OPTION

ACID TANK OPTION
TIMED ALK. INJECT.

TIMED ACID INJECT.
CONDUCTIVITY OPTION
pH NEUTRALIZATION
TIMED ALK. NEUT.

TIMED ACID NEUT.

pH CONTROLLER
DRAIN COOLDOWN
GUARANTEED COOLDOWN
COOLDOWN TANK
BOTTLE WASH OPTION
DOOR INTERLOCK
FULLY DRAINABLE SUMP
RS-232 OPTION
HEAT EXCHANGER
NON RECIRC. F. RINSE
GUAR. TEMP. SIGNAL
WATER RACK FLUSH
SUMP FLUSH OPTION
DETERGENT LEVEL(S)
EXTERNAL ALARM
TIMED COMPLETE ALARM
PIT LEVEL OPTION
CENTRAL HEADER
NON-REVERSING HEADER

=====
SERVICE MODE VALUES
=====

4000 V XXA.HEX
117-94X-XXX REV. XX
4000 V XXS.HEX
117-94X-XXX REV. XX
MODEL NUMBER: 4XXX
UNIT S/N = 36XXXXXXXXX
TIME UNITS AM/PM
ACCESS CODE IS ON
OPERATOR CODE = XXXX
CYCLES TO LOCKOUT= XX

CYCLE CNT = 00000001
SERVICE CYCLE COUNT: 9999
SERVICE DAY COUNT : 9998

SUMP DRAIN = 01:00
SUMP FILL = 05:00
SUMP HEAT = 10:00
SUMP FILL EXTENSION
TIME = 00:03

HEADER DELAY = 00:02
HEADER DRAIN = 00:10

```

(Acid wash option printed only if acid tank option not purchased)

(Timed based detergent injection when acid tank option is not present)

(Conductivity Controller option)

(pH Neutralization option)

(When pH controller option is not present)

(when pH controller option is not present)

## TYPICAL PRINT VALUES IN SERVICE MODE (Cont'd)

```

DETERGENT TANK(S)
  ALKALINE TANK
  TEMPERATURE = 140.0 F
  ACID TANK
  TEMPERATURE = 140.0 F
  REUSED WATER
  TRANSFER TIME = 01:00
  TANK FILL = 05:00
  TANK DRAIN = 02:00
  TANK HEAT = 10:00

COOLDOWN TANK
  COOLDOWN TIME = 03:00
  DRAIN TIME = 03:00
  TEMPERATURE = 140.0 F

DETERGENT MONITORING
  TIME = 03:00

NON-TIME BASED DET. INJ.

  ALK. DET. TIME = 00:10
  ACID DET. TIME = 00:10

NUMBER OF CHEMICAL PUMPS = XX

pH NEUTRALIZATION
  LIMITS LO = 01 HI = 09
  MIX TIME = 00:45
  NUMBER OF TRIES = 09
  ALKALINE NEUTRALIZER
  INJECT = 05 WAIT = 45

ACID NEUTRALIZER
  INJECT = 10 WAIT = 45
  HIGH pH CONTAINMENT
  INJECTION TIME = 02
  LOW pH CONTAINMENT
  INJECTION TIME = 06

GRAVITY DRAIN = 00:30

SUMP FLUSH = 00:30
FLUSH DRAIN = 00:45

COMPLETE CYCLE
  ALARM TIME = 01:00

```

(Acid tank option)

(Guaranteed drain cooling option)

(Conductivity option)

(Non time based detergent injection only)

(ph Controller option only)

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